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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/329,558	06/10/1999	GRAHAM CHAPMAN	12463(CA998-	8251

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EXAMINER

TANG, KENNETH

ART UNIT PAPER NUMBER

2127

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/329,558	<b>Applicant(s)</b> CHAPMAN ET AL.	
	<b>Examiner</b> Kenneth Tang	<b>Art Unit</b> 2127	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 September 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. In view of the Appeal Brief filed on 9/9/04, PROSECUTION IS HEREBY REOPENED.

New grounds of rejections are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

2. Claims 1-23 are presented for examination.

### ***Claim Objections***

3. Claims 6 and 16 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 6 and 16 teach generating a virtual stack, but their independent claims already teach constructing a virtual stack.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

a. The following is indefinite:

i. In claim 21, it is unclear whether it is a computer-readable memory claim or a method claim because claim 21 is a computer-readable memory claim but depends on a method claim. Applicant is required to put claim 21 in independent form.

ii. In claim 22, it is unclear whether it is a computer-readable memory claim or a method claim because claim 22 is a computer-readable memory claim but depends on a method claim. Applicant is required to put claim 22 in independent form.

b. The following lacks antecedent basis:

iii. Claim 1 recites the limitation "branch" in line 5. There is insufficient antecedent basis for this limitation in the claim.

iv. Claim 11 recites the limitation "branch" in line 6. There is insufficient antecedent basis for this limitation in the claim.

v. Claim 23 recites the limitation "branches" in line 18. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**5. Claims 1, 6-11, and 16-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Hall (US 5,828,883).**

**6. As to claims 1, Hall teaches the following limitations:**

mapping a path of control flow on the stack from any start point in a selected method to the destination program counter by locating a linear path (selecting a focus call path) from the beginning of the method to the destination program counter and iteratively processing (iteratively repeated) an existing bytecode sequence for each branch, and identifying said path as complete when said destination program counter is reached (desired efficiency is reached or no further improvements in efficiency can be achieved) (*col. 3, lines 35-59, col. 4, lines 7-10*); and

simulating stack actions for executing bytecodes along said path, and constructing a virtual stack (dual stack) for storage in a pre-allocated memory location (*col. 3, lines 54-59*).

7. As to claims 6, Hall teaches generating a virtual stack from executing bytecodes along the path (*col. 3, lines 54-59*).
8. As to claims 7, Hall teaches encoding the virtual stack as a bitstring and storing the bitstring at a selected destination for use in memory management operations (*col. 3, lines 54-59*).
9. As to claims 9, Hall teaches storing the bitstring to a pre-allocated area on the stack (*col. 3, lines 54-59*).
10. As to claim 10, Hall teaches wherein the step of simulating stack actions executing the bytecodes along the path further comprises: inserting pre-determined stack actions for bytecodes maintaining the control flow in the selected method; and calculating (computing) stack actions for bytecodes transferring the control flow from the selected method (*col. 3, lines 40-67, col. 7, lines 62-67*).
11. As to claims 11, it is rejected for the same reasons as stated in the rejection of claim 1.
12. As to claims 16, it is rejected for the same reasons as stated in the rejection of claim 6.
13. As to claims 17, it is rejected for the same reasons as stated in the rejection of claim 7.
14. As to claims 18, it is rejected for the same reasons as stated in the rejection of claim 8.

15. As to claims 19, it is rejected for the same reasons as stated in the rejection of claim 9.
16. As to claims 20, it is rejected for the same reasons as stated in the rejection of claim 10.
17. As to claims 21, it is rejected for the same reasons as stated in the rejection of claim 1.
18. As to claims 22, it is rejected for the same reasons as stated in the rejection of claim 11.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**19. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall (US 5,828,883) in view of Poff et al. (hereinafter Poff) (US 6,330,659).**

20. As to claims 8, Hall fails to explicitly teach storing the bitstring on a heap. However, Poff teaches a Java Virtual Machine as including bytecode instructions to store on a garbage-collected heap as well as a stack (*col. 2, lines 25-32*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the feature of storing on a

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heap to the Hall's system because this would allow for garbage collection and to utilize a memory location from which newly created instances are allocated (*col. 2, lines 37-42*).

21. As to claim 18, it is rejected for the same reasons as stated in the rejection of claim 8.

***Allowable Subject Matter***

22. Claims 2-5 and 12-15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

23. Claim 23 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

***Response to Arguments***

24. Applicant has stated in the Appeal Brief that one would perform the cited steps to facilitate garbage collection (pg. 19 and 20 of the specification). In response, the Examiner would like to point out that the cited claims make no mention of using the created stack for garbage collection purposes or that the cited steps improve upon current algorithms for garbage collection (Jepson claim). The cited claims disclose the computer implemented action of walking a stack to a target instruction/frame in order to create a virtual stack of the walk. This action could be for diagnostic reasons, error correction, or any other basis for walking a stack. In addition, the claims only mention that the stack is walked (mapped path) to a target frame/instruction. It is conceivable based on the claim as written that the stack is completely



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walked by storing the last or first stack frame/instruction in the program counter as disclosed in the cited prior art of record above. Therefore, a single path is mapped from a start of a method (initial frame) to the last method (root frame) wherein the information is stored in another stack, i.e., duplicate stack.

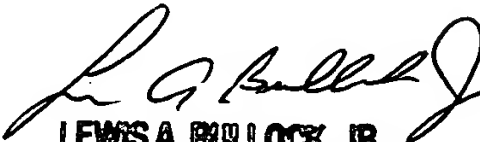
### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kt  
12/21/04

  
**LEWIS A. BULLOCK, JR.**  
**PRIMARY EXAMINER**